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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/513,396	02/25/2000	Jiong Chen	AIBT-9901	7302

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Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

EXAMINER

GURZO, PAUL M

ART UNIT PAPER NUMBER

2881

DATE MAILED: 01/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/513,396

Applicant(s)

CHEN ET AL.

Examiner

Paul Gurzo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 November 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 February 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 100. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-3, 10, and 13 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification never states the word "adjacent", and it is not clear from the specification or the drawings what the definition of adjacent should be. Further, the examiner reads the word "adjacent" to mean "nearby" as stated by Webster's Collegiate Dictionary, Tenth Edition.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adibi et al. (5,888,391), and further in view of Dawson et al. (6,111,260).

Regarding claims 1 and 10, Adibi et al. teach an ion implantation apparatus that contains a holder for a target substrate to be implanted and an ion source chamber that generates an ion beam (col. 3, lines 23-24 and Fig. 1). They teach the claimed deflection of charged particles in the ion beam to project towards the target along an angle different than the neutralized particles (col. 7, lines 50-57). They teach the use of a beam deceleration means that provides a deceleration electric field that reduces the energy of the ion beam (col. 2, lines 34-39). They also teach the blocking of neutralized particles in a mass selection chamber that prevents them from reaching the target for implantation. These neutralized particles propagate and will continue to fly in the direction of the beam ion and will be absorbed in the mass selection chamber, thus blocking them from being steered towards the target chamber (col. 7, lines 50-57). An electrostatic focusing field is established by applying a potential to a cylindrical electrode (col. 7, lines 1-5). This field is used to steer the neutralized particles in a different direction than the targeted ion beam path as described above.

They teach that the beam deceleration optics (65) is located adjacent to the target chamber, but do not teach this deceleration optics deflecting the particles. However, the design

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is structurally identical to the applicant's and the intended use of the deceleration optics is not given patentable weight. Further, Dawson et al. teach a lens (134) that is used to focus the ion beam for implantation (col. 5, lines 3-9 and Fig. 1). It is clear from Figure 1 that this lens is positioned in an adjacent manner with respect to the target chamber. While this lens acts to focus the beam, the act of deflection is an obvious modification to this design. Further, this deflection would occur adjacent to the target chamber. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the deflection means of Adibi et al. to occur in an area that is adjacent to the target chamber, much like Dawson et al., so that successful implantation of the ion beam will occur without a degradation due to neutralized particles.

Regarding claim 2, Adibi et al clearly depict the claimed analyzer magnet position (5) (col. 4, lines 24-26 and Fig. 1).

Regarding claim 3 and 13, Adibi et al. teach disposing a deceleration optics further comprising electrodes adjacent to the target chamber (col. 5, lines 51-62). The functionality of the electrodes can easily be extended to perform the claimed functionality and as such is not given patentable weight.

Regarding claims 4, 5, 11, 12, and 15, Dawson et al. teach disposing the target on a support at an inclined angle whereby the target is perpendicular to the charged particles (col. 7, lines 4-9). They also teach the use of a beam stop (130) that can be used to block the neutralized particles that are deflected in a manner described by Adibi et al.

Regarding claims 6-8, and 20, Adibi et al. teach an ion beam steering means and beam deceleration optics generating an negative off-axis field by applying a potential is applied to the

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field electrode thus generating a negative electric field that decelerates the ion beam (col. 6, lines 66-67 and col. 7, lines 50-57). They also teach deflecting the charged particles of the ion beam as described above, but fail to teach a small, deflected angle relative to the horizontal axis. However, Dawson et al. teach steering the ion beam in the direction of the wafer target that is offset approximately 5 to 10 degrees relative to the horizontal axis for scanning thereof (col. 7, lines 4-9).

Regarding claim 9, the above applied prior art makes use of a cryo-pump, but does not specify the pressure range of the chamber or the claimed ion beam energy levels. However, the teachings read on the claimed limitation, since one skilled in the art would reasonably estimate the pressure range be such so that the desired implantation will occur as claimed.

In addition, Dawson et al. teach a target chamber maintained at a pressure that is less than 10^{-6} Torr (col. 7, lines 1-2). Dawson et al. also teach that ion energy levels from 15 - 40 keV can be controlled (col.4, lines 40-41). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a target chamber with a vacuum of 10^{-5} Torr and an ion beam energy level as low as 200 eV so proper implantation will occur.

Regarding claims 14 and 16-19, the prior art discloses the claimed invention except for the appropriate beam-height to beam-width ratio. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use an ion beam with the necessary height to width ratio for proper implantation, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

Response to Arguments

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Applicant's arguments filed on November 29, 2002 have been fully considered but they are not persuasive.

In response to the applicant's argument that the prior art does not teach an adjacent placement of the beam deceleration optics and target chamber, Dawson et al. clearly depict the claimed adjacent placement of the lens and target, and Adibi et al. also teach a deceleration optics that is located adjacent to the target chamber - the definition of "adjacent" being "nearby" as stated above.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following teach ion beam implantation and method for reducing energy contamination.

Hertel (4,634,331)

Glavish (5,311,028)

England (5,932,882)

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul Gurzo whose telephone number is (703) 306-0532. The examiner can normally be reached on M-Thurs. 7:30 - 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Lee can be reached on (703) 308-4116. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

PMG
January 16, 2003


JOHN R. LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800